

AWARD NUMBER: W81XWH -12-2-0096

TITLE: **"The Development of a Mobile** Naturalistic Neurocognitive  
Assessment

PRINCIPAL INVESTIGATOR: Carmen Russoniello, PhD

CONTRACTING ORGANIZATION: East Carolina University, GREENVILLE, NC 28758

REPORT DATE: October 2014

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PREPARED FOR: U.S. Army Medical Research and Materiel Command  
Fort Detrick, Maryland 21702-5012

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13. SUPPLEMENTARY NOTES					
14. ABSTRACT The goal of this project is to develop a mobile naturalistic (game based) neurocognitive assessment and establish its initial reliability and validity on a brain injured population.					
15. SUBJECT TERMS- nothing listed					
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## **“The Development of a Mobile Naturalistic Neurocognitive Assessment”**

**PI: Dr. Carmen Russoniello, Center for Applied Psychophysiology**

**East Carolina University**

**Award No. W81XWH -12-2-0096, EDMS 5571**

**Annual Report November 19, 2014**

### **1. INTRODUCTION:**

The goal of this project is to develop a mobile naturalistic (game based) neurocognitive assessment and establish it's initial reliability and validity on a brain injured population.

### **2. KEYWORDS: Naturalistic Neurocognitive Assessment, Traumatic Brain Injury.**

**3. ACCOMPLISHMENTS:** Completed the prototype neurocognitive assessment (professional and client Apps) as well as all associated administration and user manuals (Attached to Email).



**Progress to date on Statement of Work**

ID	Task	Total Hours	Status
<b>1 Architectural Design:</b>			
1.1	Write Detailed Project Specification	80	DONE
1.2	Develop System Functional Design	80	DONE
1.3	Select Server / DBMS Platform, create Detailed Database Structure	20	DONE
1.4	Design Web-services Functional Architecture	20	DONE
<b>2 GUI Design &amp; Development:</b>			
2.1	Design Application GUI Mockup (SketchFlow) for Sys Admin WS, Professional WS, Testing app	160	DONE
2.2	Create NCA game design	30	DONE
2.3	Develop game artwork elements (layouts, graphical assets)	100	DONE
2.4	Develop Mobile NCA System Administrator GUI XAML (Expression Blend)	20	DONE
2.5	Develop Mobile NCA Professional Workstation GUI XAML (Expression Blend)	40	DONE
2.6	Develop Mobile NCA Tablet Testing Application GUI XAML (Expression Blend)	40	DONE
<b>3 Neurocognitive Assessment Implementation:</b>			
3.1	Select cognitive assessment methods, design NCA tests	100	DONE
3.2	Development of NCA software modules, testing	250	DONE
<b>4 Back-End Server Implementation:</b>			
4.1	Create Database Tables and Stored Procedures	100	DONE
4.2	Implement and test Web-services Module	80	DONE
4.3	Implement and test Mobile NCA System Administrator Application	100	DONE

<b>4.4</b>	Implement and test Mobile NCA Professional Workstation Application	140	<b>DONE</b>
<b>5 <u>Tablet NCA Application Implementation:</u></b>			
<b>5.1</b>	Implement Tablet NCA Application Framework and integrate with Server DBMS	100	<b>DONE</b>
<b>5.2</b>	Implement NCA Game Module	150	<b>DONE</b>
<b>5.3</b>	Implement NCA Reporting Modules	40	<b>DONE</b>
<b>5.4</b>	Tablet NCA Application Comprehensive Testing	100	<b>DONE</b>
<b>6 <u>System Integration</u></b>			
<b>6.1</b>	System Integration & Testing	60	<b>DONE</b>
<b>6.2</b>	Verification (Bench testing + Report writing)	100	<b>DONE</b>
<b>7 <u>Baseline Data Collection</u></b>			
7.1	IRB, Scientific Review Committee and CRADA submissions	30	<b>90%</b>
7.2	Bench testing	20	<b>80%</b>
7.2	Recruit Subjects and Administer Tests	250	<b>0%</b>
7.3	Analyze Data	50	<b>0%</b>
7.4	Compile Psychometric and Baseline Reports	400	<b>0%</b>
<b>PROJECT TOTAL:</b>		<b>2660</b>	

- **What opportunities for training and professional development has the project provided?**
- Attended 48<sup>th</sup> Annual Conference of the Association for Applied Psychophysiology in Savannah, GA March, 2014.
- Attended Workshop on filing patents and trademarks hosted by the US Patent Office. Alexandria VA, August, 2014.
- **How were the results disseminated to communities of interest?**
- "Nothing to Report."

- **What do you plan to do during the next reporting period to accomplish the goals?**
- Team will begin to explore venues for dissemination of information about the product in the military and community.
- 4. **IMPACT:** To date the impact has been minimal because the product is still in testing. The potential impact is immense, as a quantitative measure of TBI is needed for diagnosis and treatment specificity.
- **What was the impact on the development of the principal discipline(s) of the project?**
- "Nothing to Report."
- The neurocognitive assessment developed in this project is designed to eventually have the ability to differentiate between levels of TBI using naturalistic quantitative methods. As such it will provide invaluable guidance to professionals and individuals on their neurocognitive status and whether or not methods to improve it are working.
- **What was the impact on other disciplines?**
- "Nothing to Report."
- Many disciplines in physical, mental health, i.e. psychology, psychiatry, primary care, nursing will be affected. Other disciplines such as neurology, and neuroscience will also be impacted.
- **What was the impact on technology transfer?**
- East Carolina University is currently reviewing contracts with contractors and potential for intellectual property.
- Creative Cybernetics, Inc . A mobile health technology company was created as a result of the work on this project and others. The business is still in the start up phase and not currently selling any product.
- **What was the impact on society beyond science and technology?**
- This product is simple to use and will have many uses including the ability to determine the level of TBI in military personnel, athletes and others. The product provides results that are easy to interpret making it possible for individuals to do self-assessment. Our goal is to now create a game-

based intervention based upon the new assessment that will be designed to improve the areas it assesses

5. **CHANGES/PROBLEMS:** The Project Director/Principal Investigator

"Nothing to Report,"

- **Changes in approach and reasons for change**
- "Nothing to Report"
- **Actual or anticipated problems or delays and actions or plans to resolve them**
- It has taken an extraordinary amount of time getting a CRADA in place. Moreover, we are still awaiting Portsmouth IRB approval to begin the data collection phase.
- **Changes that had a significant impact on expenditures**
- "Nothing to report"
- **Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents**
- "Nothing to report"
- **Significant changes in use or care of human subjects**
- "Nothing to report"
- **Significant changes in use or care of vertebrate animals**
- "Nothing to report"
- **Significant changes in use of biohazards and/or select agents**
- "Nothing to report"

6. **PRODUCTS:** List any products resulting from the project during the reporting period.

- Mobile Naturalistic Neurocognitive Assessment, Client and professional Apps.
- **Publications, conference papers, and presentations**
- "Nothing to report"
- **Journal publications.**
- "Nothing to report"
- **Books or other non-periodical, one-time publications.**
- "Nothing to report"



- **Other publications, conference papers, and presentations.**
- “Nothing to Report”
- **Website(s) or other Internet site(s)**  
“Nothing to report”
- **Technologies or techniques**  
“Nothing to report”
- **Inventions, patent applications, and/or licenses**  
There have been no patent applications and/or licenses that have resulted from the research.
- **Other Product**
  - software;
- **PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS**
- **What individuals have worked on the project?**

Name:	Carmen Russoniello
Project Role:	PI/PD
Researcher Identifier (e.g. ORCID ID):	1
Nearest person month worked:	10
Contribution to Project:	Dr. Russoniello is PI and PD.
Funding Support:	

Name:	Nick Murray
Project Role:	Co-PI
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	10
Contribution to Project:	Dr. Murray is conducting user testing with the new software Apps
Funding Support:	

**Example:**

Name:	Brenton Laing
Project Role:	Graduate Student
Researcher Identifier (e.g. ORCID ID):	1
Nearest person month worked:	10
Contribution to Project:	Mr. Laing has been assisting in the lab testing software. He will be assisting in the collection of data needed to establish reliability and validity of the neurocognitive assessment once IRB is approved.
Funding Support:	

- **Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**
- "Nothing to Report."
- **What other organizations were involved as partners?**
- Creative Cybernetics, Inc. Sub Contractor

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<b>13. SUPPLEMENTARY NOTES</b>			
<b>14. ABSTRACT</b> The Goal of this R&D project is to develop, pilot, and deploy a mobile software platform that permits assessment and monitoring of reaction time and attention.  Due to a dramatic rise in mild traumatic brain injuries (It is estimated that 20% of all combat troops will experience a concussion while deployed) new methods to assess cognitive deficits and improve TBI are needed. The effects of traumatic brain injury are often associated with other dysfunctional conditions, specifically, and chronic pain. Posttraumatic stress (PTSD) is another comorbid condition that results in cognitive deficits and affects approximately three hundred thousand U.S. troops are suffering as a result of serving in the wars in Iraq and Afghanistan.			

<b>15. SUBJECT TERMS</b>					
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